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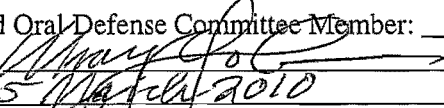
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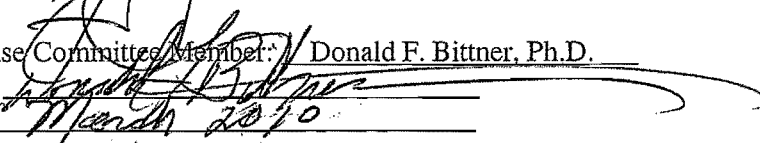
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Executive Summary

Title: Combat Search and Rescue: A Joint Endeavour

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Thesis: Specialized Combat Search and Rescue (CSAR) forces are required due to the complexity of the mission. Combining the strengths of each Service will provide combatant commanders with the most capable and flexible recovery force.

Discussion: Defense Secretary Robert Gates and other members of the government have recently questioned whether a “specialized” force is required to perform CSAR or if it can be accomplished by existing assets. This paper argues that each Service needs to maintain a CSAR capability to recover their own forces and that recovery personnel should have specialized training to perform the task. An evaluation of each Service’s CSAR capability was conducted to determine the strengths and weaknesses of each to determine whether the Services are capable of recovering their own. Historical case studies are used to illustrate how each Service has recovered personnel from other Services and how specialized training and equipment was necessary to perform such a complex mission.

Conclusion: Each Service provides adequate CSAR coverage for their own operations. In combination, joint force CSAR enhances recovery capability across the board.

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INTRODUCTION

On 6 April 2009, Defense Secretary Robert Gates terminated the US Air Force's Combat Search and Rescue (CSAR) modernization program and noted that the Department of Defense (DoD) will "take a fresh look" at the requirements for CSAR to determine whether there is a need for "specialized" CSAR aircraft and whether the mission should be performed by multiple Services using existing assets.¹ Additionally, the director of Program Analysis and Evaluation stated: "I've got 5,000 helos in DoD. When a pilot goes down, I'll just call one of them."² This notion of a "pickup game" for CSAR has its merits if one is trying to conserve resources and save money but not when an American is isolated behind enemy lines. American servicemen and women expect an attempt to be made to affect their rescue and this mission requires highly trained specialists to penetrate enemy defenses and provide any necessary medical care in order to return them to fight again.

This paper argues that specialized CSAR forces are required and that combining the strengths of each Service's CSAR capability will provide combatant commanders with the most capable and flexible recovery force. First, an evaluation of each Service's capability to conduct CSAR will highlight specific strengths that each Service contributes to the joint force as well as weaknesses requiring possible assistance from other Services. Second, historical case studies will illustrate the importance of a joint effort to recover isolated personnel and the need for specialized CSAR forces. This discussion recognizes that there are multiple methods to conduct personnel recovery but will be limited to helicopter CSAR forces.

EVALUATION CRITERIA

Department of Defense Directive 3002.01E directs that the secretaries of the military departments and the commander of US Special Operations Command organize, train, and equip forces to support personnel recovery requirements as identified by the combatant commanders.

Additionally, the Services are required to be prepared to conduct personnel recovery operations with other agencies and with host nation partners.³ Joint Publication 3-50 further requires that the Services be responsible for providing forces and processes to accomplish personnel recovery.⁴

In this paper, each Service as well as Special Operations Forces (SOF) will be evaluated based on five criteria. This discussion will remain unclassified and therefore may not address specific methods but it will specify if the Service provides the capability. First, CSAR proficiency and specialized aircraft equipment used to conduct the mission will be assessed. Current tactics, techniques, and procedures (TTPs) and the time necessary to exercise these skills will be considered. Second, the Service's ability to rapidly plan and execute a CSAR mission, including command and control (C2) integration with an ability to re-direct the mission once airborne will be examined. Third, aircraft defensive and offensive systems will be considered in regards to combating enemy air defenses and engaging threats. The fourth criterion will evaluate the Services' ability to operate in various environments. Finally, the capabilities of the recovery force personnel will be considered. The technical rescue ability, medical skills, and alternate insertion and extraction methods will be examined.⁵

US ARMY

The US Army has increased its emphasis on personnel recovery by adding Field Manual (FM) 3-50.1 (*Army Personnel Recovery*) to its doctrinal library and updating FM 3-04.113 (*Utility and Cargo Helicopter Operations*) and FM 3-04.513 (*Aircraft Recovery Operations*). Additionally, the Army has added basic survival and resistance training for all its soldiers.⁶

The Army's current TTPs reside in FM 3-04.113. This document elaborates roles, responsibilities, and provides execution checklists to effectively execute a CSAR mission. It

covers essential steps to be taken by the battalion operations center and emphasizes the request process through the personnel recovery coordination cell to obtain joint forces to fill capability gaps. The Army does not have dedicated CSAR aircraft but has outfitted some of their medical evacuation helicopters with forward looking infrared and enhanced navigation systems. US Army doctrine states that any helicopter can be used to accomplish the mission. However, only a few aircraft have hoists, which means most missions will require a landing zone to accomplish the rescue. Personnel Recovery is only one of nine sections in the employment chapter of the field manual and the Army does not routinely train for CSAR. When forced to drop a training evolution due to inadequate time or resources, complex CSAR scenarios are usually the first to fall out or are shortened to flying to the isolated person and returning to base.

The Army breaks down recovery into sub-categories: “Immediate” is the use of on-scene forces to perform the rescue. “Deliberate” is a pre-planned mission due to threat, weather, or other impeding factors. “External” involves joint or multi-national support to aid in the recovery wherein the Army maintains control of the mission.⁷ Medical evacuation assets are postured on alert and can be launched within a matter of minutes. However, launching a quick reaction force may take up to an hour before the force is assembled and ready for execution. The C2 process used for medical evacuation is also suitable for CSAR missions. The operations center is able to maintain contact with forces through satellite communications and data messages to update the crews with near real-time intelligence.

The current conflicts in Afghanistan and Iraq have resulted in almost all Army helicopters being equipped to employ countermeasures against infrared missile launches. The Army also has basic systems to detect and defeat a radar missile threat. However, training against radar threats is very limited and employing a quick reaction force sized element into an

integrated air defense network would result in a very complex mission. Medical evacuation helicopters are unarmed and usually escorted by a “slick” UH-60 Blackhawk with 7.62mm machine guns, or an AH-64 Apache attack helicopter armed with 30mm cannon, rockets, and/or Hellfire missiles. The Apache provides ample firepower to protect the formation and destroy any threats in the vicinity of the isolated personnel. In addition, FM 3-04.113 dedicates a section specifically to “escort” during a personnel recovery mission, which Apache crews have become very proficient at in Afghanistan.

US Army helicopter units are trained and equipped to fly in all environments. The Army runs a high altitude training course at Fort Carson, Colorado, that has also assisted Air Force rescue units to develop TTPs for mountain operations. Urban operations are also a strong suite for the Army. Their urban training areas are very robust and allow for integrated training with forces on the ground. Over-water rescue capability is limited in the Army due to lack of proficiency and hoist-equipped aircraft. Long distance missions are not possible without refueling on the ground. However, this can be provided by a forward arming and refueling point. The Army also maintains some units with shipboard capability for refueling or forward staging.

Adverse weather can negatively impact operations for standard Army aircraft. However, the crews are very proficient using night vision goggles. Although, current standard operating procedures limit flying when the moon is below 30° above the horizon or effective moon illumination is below 20% when not assisted by a forward looking infrared. This does not mean that the Army will not fly, but does require higher headquarters approval which could slow down the execution process.⁸

Medical evacuation and quick reaction force helicopters have an emergency medical technician onboard with life saving equipment. However, Army medics are not trained

specifically for rescue and would therefore require additional trained personnel to perform these duties. Downed aircrew recovery teams can provide site security, extrication equipment, and aircraft maintenance and weapons specialists, but are designed to recover the aircraft, not the isolated personnel.⁹ Army aircraft are capable of employing personnel with fast rope insertion and extraction system. The TTPs further spell out the use of fast ropes for downed aircrew recovery teams in mountainous and urban terrain.¹⁰ The limitation with a fast rope is having qualified soldiers to perform the task. Additionally, if the isolated person has substantial injuries, a fast rope is not an optimal extraction technique.

In the end, the US Army possesses an adequate level of CSAR capability to accomplish most potential missions. Key strengths include rapid response, the ability to operate in mountainous and urban terrain, and armed escort. Weaknesses include limited technical rescue expertise, limited range, and minimal threat suppression capability when not escorted by Apaches.

US NAVY

The US Navy places strong emphasis on CSAR by integrating the concept into planning and execution of all strike operations.¹¹ Most Navy CSAR forces were relegated to the Reserve component in the 1980s but have made their way back into the active force as a secondary mission. When the Navy began replacing its H-60 variants they ensured that all aircraft would be capable of CSAR.¹²

Navy Warfare Publication (NWP) 350.22 (*Combat Search and Rescue Manual*) spells out in detail all aspects of CSAR to including fixed-wing support. Additional classified TTPs are located in Navy TTP 3-03.4 (*Naval Strike and Air Warfare*). The Navy's helicopter division at the Naval Strike and Air Warfare Center dedicates an entire portion of the curriculum to CSAR.

The school also hosts a ten day CSAR exercise complete with threat simulators and assets from all the Services.¹³ The Navy's sea combat squadrons are trained and equipped for CSAR. The new MH-60S is hoist equipped and has electronic equipment to assist in the search phase. The strike maritime squadrons are more focused on anti-submarine warfare and support missions. However, strike maritime helicopters have hoists and can be used as a recovery helicopter.¹⁴

Routine Search and Rescue is an everyday job for helicopters in the Navy. Navy helicopters are either airborne or on alert. However, crews may not be well versed in CSAR techniques. That said, when tasked, CSAR crews maintain a separate alert and are able to quickly plan for and execute a mission in minimal time.¹⁵ But if those crews are performing CSAR as a secondary mission they must be released from their primary mission (e.g., SOF support) prior to execution. Transfer is usually not an issue, but doing so may increase the time required to execute the mission. Once airborne, Navy crews can receive updates from airborne C2 assets and usually have a dedicated Rescue Coordination Team providing support.

Navy intelligence personnel have created a threat matrix specific to their helicopters to help aid in planning for opposed CSAR missions.¹⁶ The helicopters are equipped with infrared and radar guided missile protection. However, the amount of training varies between units. NWP 3-50.22 recommends not prosecuting a CSAR mission in a radar threat environment. Navy H-60s are armed with 7.62mm or .50 cal machine guns, but some aircraft have limited fields of fire. The sea combat squadrons are capable of firing Hellfire missiles when configured. Opposed overwater strike rescue and fixed-wing escort TTPs exist, but training is minimal at the unit level. Nevertheless, Naval Strike and Air Warfare Center exercises provide realistic training with threat emitters and a myriad of joint assets focusing on CSAR.

Overwater rescues are the forte of the Navy. Crews are highly skilled in open water flying and hovering in most weather conditions. Sea combat squadrons are trained in low-level overland operations and the Navy is working to train the strike maritime squadrons as well. Until complete, however, almost half of the Navy's helicopters are limited in their ability to conduct low level flights over land. Sea combat squadrons are very proficient in mountain and desert flying. Urban operations are limited and usually focused on SOF support.

All Navy crews are qualified for shipboard operations which increases their ability to refuel during overwater rescues. Internal fuel tanks on Navy H-60s are larger than standard, giving them increased range. Moreover, the Navy has ordered air refueling probes and is developing a training program for their pilots. Navy helicopter pilots are proficient in flying overwater and performing shipboard operations at night with and without night vision goggles. The addition of the forward looking infrared turret on new H-60s will greatly enhance night flying and search capabilities.¹⁷

Navy rescue swimmers are highly skilled aircrew who can deploy from the helicopter by hoist or by jumping from the helicopter. These swimmers are not required to maintain any additional special medical certification or technical rescue capabilities; however, most squadrons have begun in-house emergency medical technician certification programs.¹⁸ When Navy helicopters are manned with SEAL teams, their medical and technical expertise is greatly increased. SEAL teams allow for the use of fast ropes, rappelling, and rope ladders as alternate insertion and extraction methods.

The US Navy can field a robust CSAR package when required. The key strength for the Navy is their familiarity with and expertise in overwater operations. An additional strength, when properly equipped and manned, is the ability to fire Hellfire missiles and employ SEAL

teams. Weaknesses include proficiency in overland operations when at sea for extended periods and competing training priorities.

US MARINE CORPS

The Marine Corps lives by the adage that “Marines Take Care of Their Own.”¹⁹ The Marines do not have a specialized CSAR force because they view personnel recovery as an “implied task.” However, the Marine Air-Ground Task Force (MAGTF) includes assets to perform Tactical Recovery of Aircraft and Personnel (TRAP) missions.²⁰ For the purposes of this paper, TRAP will be considered as the CSAR force used by the Marines.

The major difference between TRAP and CSAR is the lack of an extended search phase. The location of the isolated personnel must be known within one nautical mile. Also, there must be assurance that the survivor is alive and not in imminent danger of capture.²¹ The TRAP force can range from a single helicopter to an entire task force, including fixed-wing escort. This flexibility gives the MAGTF commander a range of options when creating a TRAP force.

The Marines accomplish pre-deployment TRAP training ensuring that all air and ground assets involved are proficient prior to deployment. In that regard, the Marine Aviation Weapons and Tactics Squadron-1 provides instruction for its Weapons and Tactics Instructors on TRAP techniques and joint integration.²² These instructors then teach relevant TTPs at the unit level. Marine helicopters are equipped with basic directional finding equipment and enhanced navigation systems to aid in locating the isolated personnel. Some aircraft also have forward looking infrared capability and hoists.²³

The Marines break down recovery into the same three categories as the Army: immediate, deliberate, and external support.²⁴ With this in mind, the Commandant of the Marine

Corps stressed in his personnel recovery policy letter that immediate action will be taken to recover any isolated personnel.²⁵

TRAP forces can assume different levels of alert posture. For major operations or when directed, the TRAP force will establish an alert posture for immediate launch. During other periods, the TRAP force may simply identify personnel and assets that are not committed or tasking the mission as a secondary role. The C2 structure is simplified for the MAGTF since all components fall under one command. However, the integration of joint or coalition assets may complicate the operation due to the lack of standard operating procedures.

Most Marine helicopters are equipped with infrared and some radar guided missile protection. However, training against radar threats is limited.²⁶ The TRAP decision matrix recommends using joint or coalition assets to recover an isolated person when radar threats are medium or higher.²⁷ Lift helicopters are armed with 7.62mm or .50 cal machine guns. Attack helicopters, e.g., the AH-1 Cobra and UH-1N Huey, can employ 20 mm guns, rockets, and Hellfire missiles. The combination of lift and attack helicopters provides ample firepower to defend the TRAP force. The MAGTF also has fixed-wing aircraft that are very proficient in helicopter escort.

Marine helicopters train to fight on land and sea allowing them to operate effectively in most environments around the world. Marine helicopter crews also train for non-combatant evacuations in urban areas. Their proficiency in urban operations is enhanced by their close work with ground forces during such missions. Some Marine helicopters have air refueling probes but the majority require a forward arming and refueling point for extended range operations. A forward arming and refueling point can be established using the tactical bulk fuel delivery system at an unimproved landing site along the flight route. This self sufficient system

improves the range of the TRAP force. The addition of the MV-22 Osprey tilt-rotor aircraft greatly increases the range of the TRAP force, but requires fixed-wing support due to its speed and range. Finally, Marine helicopters can refuel aboard ships to extend their range and the Marines have no limitations when performing night operations.

The TRAP force does not have specific technical rescue capability. However, the maintenance element of the force can assist in extrication with their specialized equipment if necessary. The embedded Navy Corpsman is capable of providing medical care to an isolated person. TRAP teams are also capable of performing fast rope insertions for restricted operating areas; however, the TRAP force will need to move an injured isolated person to a suitable landing area, increasing the time in the area unless hoist equipped.

In the final analysis, the TRAP force is a highly capable asset available to the MAGTF commander to perform personnel recovery. The key strength of the TRAP force is the MAGTF itself. Additional strengths include the ability to operate over land and water, including urban areas, and the firepower available from the rest of the MAGTF. Weaknesses include the lack of training for an extended search, the limited ability to operate in a medium threat environment, and the time required to assemble and launch a TRAP force.

US AIR FORCE

In 2004, the Air Force changed its CSAR doctrine title to *Personnel Recovery Operations*, recognizing that not only downed aircrew can be isolated. This did not change the emphasis on CSAR operations but reaffirmed the philosophy that rescue forces “must be prepared to recover any isolated personnel anytime and anyplace.”²⁸

The Air Force dedicates specific aircraft and aircrew for personnel recovery operations. These CSAR forces train on a daily basis to perform the most complex recovery missions. The

Air Force's Weapons School has a dedicated CSAR division that trains instructors not only to be helicopter CSAR experts, but also to master the integration of available forces into a Combat Search and Rescue Task Force. These additional assets provide rescue escort, strike, air superiority, C2, and intelligence, surveillance, and reconnaissance. The rescue escort assets are not only trained to protect the helicopters but also possess the skills to locate, authenticate, protect, and, worst case, "bed-down" the isolated personnel as required.²⁹ Additionally, Air Force rescue personnel attend large force exercises such as Red Flag, Desert Rescue, and Angel Thunder to execute rescue task force procedures and joint integration training.³⁰ The HH-60 Pavehawk is designed for CSAR with integrated systems designed to search for, locate, and recover an isolated person. The HC-130 King is also equipped with locating equipment, the ability to refuel helicopters, as well as airdrop supplies or infill pararescue jumpers (PJ) to isolated personnel.

Air Force doctrine delineates two types of response postures: alert for immediate response and deliberate for preplanned missions. Standard operating procedure for the Air Force is to maintain either ground or airborne alert. Air Force training focuses on contingency planning which allows the CSAR assets to respond quickly to most situations without much additional planning. Once airborne, Air Force CSAR aircraft can receive mission updates from the C2 or the CSAR tactical operations center using line-of-site radios or over the horizon capabilities.

The HH-60 and HC-130 are equipped with infrared and radar guided missile protection. Air Force crews train against simulated threats during aircraft and simulator training missions. The HH-60 is armed with 7.62mm mini-guns or .50 cal machine guns. These weapons can be configured for side firing or fixed forward depending on the threat. The rescue task force can

also provide firepower from fixed-wing escort and strike aircraft. Air Force rescue aircraft have sufficient firepower to protect the isolated personnel and themselves in a hostile environment.

The Air Force trains to conduct personnel recovery in all environments and most weather conditions. The past decade of conducting desert and mountain operations has greatly increased proficiency in these areas. However, night overwater rescue training has been limited to dedicated aircrew at certain units. The Air Force trains for urban CSAR missions during exercises such as Angel Thunder but only maintains a limited proficiency in urban helicopter operations. The HC-130 tanker allows for the air refueling of the HH-60, extending its range to the limits of the crew. Additionally, Air Force crews are capable of forward arming and refueling and also maintain a cadre of shipboard qualified aircrew. The shipboard qualification allows Air Force crews not only to refuel aboard naval vessels but also to operate from them when land bases are not available. Air Force crews use night vision goggles and forward looking infrared for night operations and currently have no limitations.

Pararescue Jumpers are the only DoD personnel specifically trained to perform personnel recovery. They are trained in advanced technical rescue skills such as confined space, underwater, high angle, and extraction. They are also trained paramedics, equipped with advanced life saving equipment on the helicopters. PJs can be “infilmed” or “exfilmed” via fast rope, rappel, rope ladder, hoist, or even parachute from the HC-130 prior to the helicopter arriving on scene.³¹ PJs give the Air Force more than adequate technical and medical skills to perform CSAR.

Overall, the Air Force maintains a highly trained and capable CSAR force to perform worldwide recovery missions. This force is capable of fulfilling many other collateral missions such as non-combatant evacuations, disaster relief, casualty evacuation, and SOF support.³² The

Air Force's key strength is having a dedicated CSAR force. This force is equipped for and trains specifically to recover isolated personnel in the worst possible situations. An additional strength is the ability to rapidly plan, launch, and execute with minimal planning. Weaknesses include urban operations and night overwater rescues based on limited proficiency due to current operations.

SPECIAL OPERATIONS FORCES

Special Operations Forces are tasked like the Services with providing their own personnel recovery capability. This capability is designed for the recovery of SOF personnel during specific SOF operations.³³ However, SOF has been called upon to provide CSAR during recent operations such as DESERT STORM, DENY FLIGHT, and ALLIED FORCE. In each instance SOF performed superbly and returned American and Allied personnel to safety.

Special Operations Forces do not normally dedicate assets exclusively for the purpose of CSAR. However, personnel recovery is planned into every operation. This is done by designating certain members of a force as the CSAR team in the event a member of the force is isolated. CSAR training is a key component during mission rehearsal for SOF operations due to the risk involved. SOF training is very similar to conventional CSAR training when it comes to flying through enemy defenses, conducting operations at an objective, and returning to friendly territory. One main difference is that SOF chooses the time and place to execute a mission whereas as the enemy chooses during a CSAR mission.³⁴ SOF helicopters are hoist-equipped and possess adequate electronic equipment to assist in the recovery of isolated personnel.

Normal operating procedures do not place SOF on CSAR alert. This would create an undue burden on an already small force. Additionally, SOF is accustomed to a planning cycle that involves detailed intelligence and multiple rehearsals to ensure mission success, which is not

conductive to executing time sensitive CSAR missions. However, when SOF is placed on CSAR alert, they are able to rapidly plan, launch, and execute. Once airborne, SOF assets are capable of receiving updates from multiple C2 services via line of site or over the horizon communications. This allows them to be redirected from one mission to another.

Special Operations Forces helicopters are equipped with infrared and radar guided missile protection. SOF crews are proficient in flying in hostile airspace. Each helicopter is armed with either 7.62mm mini guns or .50 cal machine guns. SOF attack helicopters, e.g., the AH-6 “Little Bird” and MH-60 “Direct Action Penetrator” are armed with 30mm guns, rockets, and Hellfire missiles. Depending on the threat, SOF can use the AC-130 Gunship as additional firepower and can also take advantage of its speed and sensors to make contact with and “maintain eyes” on the isolated personnel prior to the helicopters arriving. SOF firepower is more than adequate to protect the isolated personnel and the CSAR package.

The nature of SOF missions requires crews to be proficient in worldwide operations. SOF helicopters are capable of operating in most weather conditions and environments. Certain missions performed by SOF provide adequate training for operating in urban terrain. For long range missions, SOF helicopters are equipped with an air refueling capability. Special operations crews are also capable of forward arming and refueling and are shipboard qualified to extend their range if required. Night operations are the specialty of SOF aviation; the helicopters are equipped with forward looking infrared, and the crews are highly proficient in night vision goggle flying.

Dedicated SOF rescue crews usually contain at least one Air Force PJ. If PJs are unavailable, SOF medics are qualified emergency medical technicians and other team members

will assist in the technical rescue portion of the recovery. SOF personnel can be “infilled” or “exfilled” via fast rope, rappel, rope ladder, and hoist to ensure operations are not limited.

Special Operations Forces have proven their ability to perform CSAR missions. However, its forces are primarily designed to recover SOF assets during SOF missions and do not generally maintain alert for joint recovery missions. SOF’s key strength is the ability to operate in a high threat environment. Other strengths include night operations and multiple range extension methods. Weaknesses include the lack of search training, and, when not on alert, the SOF planning and rehearsal cycle could increase the time to execute.

THE JOINT FORCE

The Joint CSAR force is the combination of all the Services’ CSAR capabilities. Each Service maintains a personnel recovery coordination cell and the Joint Force Commander establishes a joint personnel recovery center. When a recovery mission exceeds a Service’s capability, it will request support from the Joint Force Commander through the joint personnel recovery center.³⁵ This current force structure maximizes the capabilities of each Service allowing them to focus their efforts on the most probable recovery missions.

When evaluating the entire joint force regarding CSAR, the strengths have already been noted and will not be repeated. The most notable weakness would be coordination between the personnel recovery coordination cells and the joint personnel recovery center. Possible delays in mission notification to a supporting Service may occur depending on the tasking process established by the Joint Force Commander. Worse, information on the isolated personnel or threats to the CSAR package can be lost during the transfer of information through the joint personnel recovery center. These weaknesses are being addressed with increased information

flow, use of emerging technologies, and a better understanding of joint capabilities at the personnel recovery coordination cell level.

The effectiveness of the Joint CSAR Force has been commented upon by coalition observers. A letter from the Commander of the Royal Netherlands Air Force (RNAF) to the US Air Force Chief of Staff expressed concern over the lack of commitment to advancing CSAR capabilities. The RNAF commander specifically discussed European forces reliance on CSAR coverage from the United States for high threat recovery missions. He also noted that future operations will require that coalition assets work together to provide the best possible recovery options.³⁶

HISTORICAL CASE STUDIES

With the above in mind, the following case studies will demonstrate the importance of each Service maintaining a specialized CSAR force. This paper recognizes that each Service has recovered many of its own personnel but will focus on recoveries where joint or coalition assistance was employed.

The first documented aerial rescue dates to 1870 during the Franco-Prussian War. A balloon was used to evacuate injured troops from the battlefield to prevent their capture by the enemy.³⁷ WWI and WWII advanced aerial rescue by the creation of rescue units within the Services. During WWII, Air Force and Navy rescue assets divided areas of responsibility in the English Channel, the Mediterranean, and the Pacific theaters to ensure the best coverage for each Service.³⁸ In 1944, US Army Air Force Lieutenant Carter Harman rescued three downed British aircrew deep behind enemy lines in Burma, marking the first documented combat rescue using a helicopter.³⁹ These cases illustrate that even early leaders recognized the importance of creating a specialized force to ensure the rapid recovery of personnel. During the infancy of dedicated

rescue, the Services also understood the importance of relying on each other to fill the gaps utilizing the best means available.

The Korean War provided an opportunity for the Services to use new helicopters and develop rescue tactics in an unforgiving combat environment. Rescue equipment such as hoists and rope ladders were introduced as standard equipment on CSAR aircraft. On 13 April 1951, a Marine helicopter escorted by Marine and Air Force fixed-wing aircraft performed the recovery of an Air Force F-51 Mustang pilot shot down north of the Kwachon Reservoir. The initial rescue helicopter was shot down on the route home but the crew and survivor were quickly recovered by another Marine helicopter.⁴⁰ The Air Force returned the favor on 5 December 1952 by recovering Marine Colonel Robert Galer after his F-4U Corsair was shot down. The rescue helicopter's instrument panel was shot out by some of the same anti-aircraft-artillery that shot down Colonel Galer but the pilot was still able to return home. Air Force CSAR aircraft also assisted with aero-medical evacuations between rescue missions and were credited with evacuating over 7,000 wounded United Nations personnel to front line aid stations during the war.⁴¹ These missions demonstrated how dedicated rescue forces in the most favorable positions were expeditiously launched to recover downed pilots in a timely method.

During the Vietnam War, 4,000 lives were saved by the US Air Force Air Rescue and Recovery Service.⁴² The Air Force lost, on average, one CSAR aircraft per 4.5 CSAR sorties. Although this loss rate seems large, the Navy was at one point losing one CSAR aircraft for every 1.4 CSAR sorties.⁴³ The Marines and Army experienced similar loss rates. For example, a Marine helicopter attempting to recover a downed Army crew crashed into trees as it was trying to low hover because it did not have an adequate rescue cable. Army helicopters not trained in night overwater rescue often called off the rescue of isolated personnel floating out to sea due to

the risk.⁴⁴ These statistics validate the need for specialized CSAR aircraft and crews. That said, these examples were not meant to denigrate the courage of those who risked and lost their lives attempting to recover their comrades. However, these missions demonstrate that CSAR is a complex mission that should not be executed as a “pickup game” with just any helicopter.

By the outbreak of DESERT STORM, CSAR forces had been neglected. The Air Force was transitioning to a new helicopter but did not have enough deployable squadrons ready in time for the deployment to DESERT STORM. This forced SOF to take on the CSAR mission. Another major difference from Vietnam was leadership’s unwillingness to accept the increased risk associated with CSAR. This attitude left many pilots wondering if there would even be a rescue mission launched for them if they were to go down.⁴⁵ DESERT STORM proved that CSAR could still be accomplished even after the neglect and lack of confidence in leadership to accept some risk when it came to recovering personnel. However, DESERT STORM also demonstrated that CSAR should be conducted by capable and trained crews.

On 20 January 1991, a Navy F-14 was shot down by an SA-2 surface to air missile west of Baghdad. Two Air Force SOF helicopters and two A-10 escort aircraft planned and launched against a robust air defense that included Iraqi helicopters and fixed-wing aircraft. The helicopters had to return to base for fuel and one of the F-14 aviators was captured. However, the rescue crews launched again to meet up with their A-10 escorts and added F-15s to take care of any enemy aircraft. Enroute, the helicopter defeated a Roland radar missile system and used direction finding equipment to locate the downed aviator. The crew arrived at the objective, deployed its PJs, and rescued the downed aviator.⁴⁶ This mission illustrates the importance of properly trained and equipped crews being able to deal with difficult unplanned circumstances that can arise during CSAR mission. On the other hand, there was the attempted rescue of an Air

Force F-16 pilot by an Army UH-60 that was shot down resulting in five killed and three prisoners of war. This mission was initially tasked to the dedicated SOF rescue forces and other SOF helicopters, but it was deemed that the threat was too high to execute the mission at that time. Not to diminish the bravery and selflessness of the Army crew, but they were not prepared for this mission. The crew had poor intelligence, the threat in the area was high, and it was suspected that the pilot had already been captured. In addition, the crew was not trained in the use of all the supporting assets that were available to aid them in the rescue.⁴⁷ If the crew had been fluent in CSAR execution procedures, better intelligence would have been obtained from the C2 assets resulting in either a different route taken or an abortion of the mission.

Operation DENY FLIGHT over Bosnia provides a perfect example of how to use the most appropriate force to accomplish a timely successful CSAR mission. On 2 June 1995, Basher 52 (Captain Scott O'Grady) was shot down by an SA-6 surface to air missile. The pilot was not initially heard from, but the NATO forces immediately started planning a rescue effort. This effort included repositioning a Marine Expeditionary Unit closer to Bosnia because dedicated CSAR assets were located across the Adriatic Sea in Brindisi, Italy. Five days later, contact was made with the pilot and a Marine Corps TRAP force, which also included coalition fixed-wing support, successfully executed the mission.⁴⁸ If the Marines did not have crews trained for TRAP, their closer proximity to the pilot would not have mattered. Furthermore, it would have resulted in the recovery being delayed due to the increased distance flown by the theater CSAR forces.

During Operation ENDURING FREEDOM, CSAR was deemed so important that the operation did not start until the Joint Force Commander was confident there were adequate CSAR measures in place. The complex recoveries accomplished during Operation ENDURING

FREEDOM indicate the need for highly trained personnel to be available and strategically located for rapid response. The best way to ensure this coverage was to capitalize on the strengths of each Service.

On 20 October 2001, A Marine TRAP force was assembled aboard the *USS Peleliu* to recover a downed Army helicopter in Pakistan. The extended distance required the Marines to establish a forward arming and refueling point for their escort attack helicopters.⁴⁹ Two pieces were vital for the recovery mission: the Marines were located off the coast, and their ability to refuel their attack helicopter escort. Another example of special training and equipment being essential was the recovery of an Australian Special Forces soldier. The soldier was injured by a land mine some 250 miles west of Kandahar. To expedite medical care, an Air Force CSAR unit was tasked. The HC-130 proceeded directly to the injured soldier and the PJs parachuted into a small cleared safe area next to the mine field. After dropping the PJs, the HC-130 stood by in case the helicopters needed to refuel in-flight. As the PJs were preparing the soldier for transport, the helicopters arrived and picked up the soldier and PJs that had parachuted in.⁵⁰ This complex recovery mission could not have been performed by any other Service. The ability to conduct a night time parachute jump of combat trained paramedics into a minefield followed by a recovery using air refuelable helicopters on a moment's notice is only maintained by Air Force CSAR.

Operation IRAQI FREEDOM finally saw an Air Force CSAR force reminiscent of Vietnam. With additional Air National Guard and Reserve Units, the Air Force was able to maintain coverage in two locations in Afghanistan and stand up three separate CSAR squadrons around Iraq's border. The Navy also stood up rescue forces primarily responsible for southeast

Iraq and over water rescues.⁵¹ These additional CSAR forces allowed the other Services to focus on their primary responsibilities.

During the initial stages of the war in Iraq, a Marine Corps reconnaissance unit was compromised and attempted to evade the enemy. Air Force CSAR was best postured to recover the Marines.⁵² Their location, alert status, and ability to execute a mission against a threat led to the success of the mission. Another Air Force mission was the recovery of a Navy F-14 crew whose aircraft suffered mechanical failure over southern Iraq. The Naval aviators were not proficient with their recovery equipment techniques which caused confusion about their location. However, the specially trained A-10 escort aircraft were able to locate the aviators and vector the helicopters directly to the location. Having the CSAR helicopters staged in Jordan and then forward into Iraq allowed for a quick recovery of the isolated aviators.⁵³

Once the initial stages of IRAQI FREEDOM were concluded, CSAR assets were centralized in Baghdad, then Balad Air Base. On 16 April 2004, Sky King 61, an Army CH-47, crashed in a dust storm approximately 70 miles east of Baghdad. The Army could not support a rescue and requested assistance. The joint personnel recovery center used national assets to triangulate the location of Sky King and scrambled the Air Force CSAR crews at Balad. The helicopters immediately launched into the dust storm. The crews established a search of the last known position in less than one-half mile visibility. One of the crews spotted the survival strobe and successfully landed in zero visibility conditions for the recovery. On the return trip the helicopters were engaged by multiple infrared missiles and machine gun fire.⁵⁴ This mission demonstrates the importance of maintaining specialized CSAR force trained to perform in worst case conditions.

CONCLUSION

The evaluation of each Service's CSAR capability confirms that the Services are complying with DoD Directive 3002.01 and Joint Publication 3-50. Each Service maintains an ability to recover isolated personnel and support the other Services when required. The combination of each Service's strengths results in a Joint Force with no major CSAR limitations. The Air Force's dedicated CSAR force is the most comprehensive and specialized collection of assets. The Air Force has the ability to conduct CSAR in almost any environment or situation with minimal planning and preparation. However, it would be impractical for the Air Force to perform every CSAR mission for the Department of Defense. There are many small scale operations around the world that require a CSAR capability to alleviate risk. The limited Air Force CSAR assets and the time required to deploy them to every operation would create an undue burden on resources and increase the time to execute the operation. The current structure allows operations to be performed worldwide using the best available CSAR capable force.

The missions discussed in this paper demonstrate that CSAR can and should not be performed as a "pickup game." Specialized aircraft and crews must be maintained to ensure that isolated personnel are not left behind due to lack of equipment or training. It is not recommended that every Service maintain a specialized force like the Air Force. It is suggested, however, that each Service maintain their CSAR strengths to provide for the recovery of their forces. Where the Service is unable or the risk is too high, another Service that is in the best position and trained in that skill set will accomplish the mission.

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